Key Enterprise Architecture Value Drivers: Results of a Delphi Study

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Abstract

The value of Enterprise Architectures is undoubtedly an issue that is of particular importance in organizations. In the current context of strong economic constraints and the need to justify the usefulness and investments on Enterprise Architectures are increasingly demanding an assessment and demonstration of its value. However, it is recognized that assessing and demonstrating the value of Enterprise Architecture is not an easy task. In our view, the lack of a clear understanding on what is important for Enterprise Architecture value assessment, the intangible nature of some benefits and the need to quickly demonstrate the Enterprise Architecture value are some of the main reasons for this difficulty. This article presents the results of an international Delphi study involving 63 experts which main objective was to identify, systemize and prioritize the key value drivers of the Enterprise Architecture.

Keywords: Enterprise Architecture; Enterprise Architecture Value; Value Drivers

1. Introduction

Enterprise Architectures are being increasingly recognized as an important tool in the organizations' design and development. However, despite the significant level of development in approaches, frameworks and methods used in the construction of Enterprise Architectures, there is still no consensus about what is an Enterprise Architecture. This lack of consensus is the result of different perspectives on Enterprise Architectures, as it is seen as a set of descriptions (Bernard, 2005), a taxonomy (Rico, 2006), a process (Lapkin et al., 2008), a function (Raadt and Vliet, 2008), a discipline (Gartner, 2012) or a management practice (Vries and Rensburg, 2008), and comprises principles, methods and models (Jonkers et al., 2006). Moreover, there is an important discussion about whether the Enterprise Architecture should be descriptive or prescriptive (Hoogervorst and Dietz, 2008), that is, if an Enterprise Architecture should be used to describe the current characteristics of the organization (AS-IS state) or to define how the organization should be (TO-BE state).

Regardless of the definition used, it is widely claimed that an Enterprise Architecture can help organizations in many ways and in many areas. In scientific and technical literature it is easy to find reference to a large number of benefits and outcomes of Enterprise Architectures (e.g., (Boucharas et al., 2010, Morganwalp and Sage, 2004, Niemi, 2006)). However, the description of these benefits and outcomes are not always clear and perceived by different stakeholders in the same way, making it too complex to identify all of them. In fact, the effort to identify all benefits and outcomes of Enterprise Architectures can be tremendous and virtually impossible to do it.

As the construction, maintenance and governance of the Enterprise Architectures matures into an established function in a significant number of organizations, senior management and Enterprise Architecture managers are increasingly being challenged to present objective evidence of its contribution to the organization. Like any organizational initiative it is needed time, money and effort to design, initiate and embed an Enterprise Architecture within the organization. Therefore, given the substantial investment that it represents and the need of current organizations to save resources and prioritize investments, it is perfectly understandable that they want to know if there is an effective and appropriate return from their Enterprise Architecture.

Mainly, the assessment of Enterprise Architecture's value requires the implementation of a measurement system that gathers the complex information about the use and impact of Enterprise Architecture. But before implementing this measurement system it is necessary to clearly understand and know what is important to measure. In management field, one of the most important and recognized concept in Value Analysis is the value driver concept. In this context, value driver is any variable (action) that affects the business performance of the organization in the short or long term and therefore creates value (Koller et al., 2005). Applying this concept in Enterprise Architectures, an Enterprise Architecture value driver is any variable that affects the value of Enterprise Architecture to the organization. In our view, these variables can be characteristics or actions (activities) of an organization that are affected by an Enterprise Architecture program and on a short or long term basis influence the performance of the organization (and creates value).

Given the lack of empirical studies that clearly and systematically identify the value drivers of Enterprise Architecture it was considered to be of great interest and importance to develop such a study, which results are now presented in this paper.

2 Research Question and Research Design

Nowadays, it is still very difficult for organizations to assess the value of Enterprise Architectures. In our view, the lack of a clear understanding on what is important for Enterprise Architecture value assessment, the intangible nature of some benefits and the need to quickly demonstrate the Enterprise Architecture value are some of the main reasons for this difficulty. In order to clarify these issues, it was decided to conduct a Delphi survey with the objective to identify, systemize and prioritize the responses of an international group of experts in Enterprise Architectures to the following main research question:

- *What are the key value drivers of Enterprise Architectures for organizations and what is their ranking of importance in organizations?*

Additionally, two other questions were formulated and asked to participants in the study; however they are not subject of analysis in this paper. Only for information, these two questions were: (1) which value drivers of Enterprise Architectures can be realized in short term (less than a year) and (2) which value drivers of Enterprise Architectures are of tangible nature.

The Delphi method was chosen for several reasons. Firstly, the Delphi method is a widely accepted method to obtain a consensus of opinion from a panel of experts, in this case on what are the key value drivers of Enterprise Architectures. Secondly, the Delphi method can be used as a function of the validity and quality of the initial list selection process (Scott et al., 2006). Thirdly, the Delphi method is being used in situations where vague, unknown or contradictory opinions exist, while limited scientific evidence to guide evidence-based decision-making exists (Plessis and Human, 2007). Finally, the Delphi method was chosen because it is considered an appropriate method for collecting data that result from subjective judgments (Linstone and Turoff, 1975) and allows the participation of a group of experts that would be impossible to contact personally.

The aim of employing the Delphi method is to achieve consensus through a structured and iterative process of listing, refining and aggregating the opinions and perceptions of a group of people, called the expert panel, that could make valuable contributions to the resolution or understanding of a complex topic or problem in order to create a consensual shared vision on the matter under discussion (Soares and Amaral, 2011).

In this research we used a web-based modified Delphi survey with a predefined list of value drivers generated from an extensive literature review. In a classic Delphi the questionnaire used in the first round is usually an open questionnaire that allows participants to freely express their opinions and suggestions. However, this can lead to a very large number of items and make the questionnaire of the following rounds too large (Keeney et al., 2001) and more complex to answer. In order to simplify it is often conducted a modified Delphi in which in the first round is used a questionnaire with a predefined list of items, which speeds up the responses of experts and helps to reduce the number of rounds of the study.

2.1 Expert Panel Selection

The selection of the expert panel is commonly seen as a vital aspect that potentially determines the success and confidence on the results of a Delphi study (Powell, 2003). Delphi panelists are typically selected not for demographic or statistical representativeness but for the perceived expertise that they can contribute to the topic. In order to obtain the desired valid results Scheele (Scheele, 2002) suggests that the panel must be selected from stakeholders who will be directly affected, experts with relevant experience and facilitators in the field under study.

Taking this into consideration was decided to invite for this study three key types of Enterprise Architecture stakeholders, namely Enterprise Architects, Enterprise Architecture program/project leaders and Senior Managers, that in our opinion are the ones that may have a more comprehensive perspective on the impact of Enterprise Architectures in organizations. On the other hand as it was also considered important to include the academic perspective, some members of academia with expertise in enterprise architecture research were also invited.

Using an approach similar to the one taken by Okoli and Pawlowski (Okoli and Pawlowski, 2004) 166 experts were identified and contacted via e-mail requesting voluntary participation in the study (of which 144 were identified by authors and 22 suggested by the invited experts).

From the 166 experts invited, 75 (45%) accepted to participate in the Delphi study, but only 63 (40%) actually participated at least in one of the three rounds carried out in this study. The 63 participants were from 17 different countries: South Africa, Australia, Brazil, Canada, South Korea, Denmark, Slovenia, United States, France, Netherlands, Ireland, Japan, Portugal, United Kingdom, Singapore, Sweden and Switzerland. Regarding to professional background of the panel experts, 42 reported that they had an IT background (67%), 11 a Management background (17%), 6 reported a both IT and Management background (10%) and 4 indicated other areas (6%). Finally, in terms of experience in Enterprise Architecture positions/jobs, 33 experts referred that they already had experience as Enterprise Architect, 19 as Enterprise Architecture project leader/manager, 14 as senior manager and 38 as Enterprise Architecture researchers (please note that each expert could indicate experience in more than one position).

2.2 Predefined List Generation and Questionnaire Structure

In a “modified” Delphi survey, the establishment of a predefined list of items in order to simplify the process of identifying them is of particular importance since it could have a significant impact on the study results. In order to compile a list of value drivers as relevant and complete as possible, it was conducted a structured and extensive literature review similar to the approach proposed by Webster and Watson (Webster and Watson, 2002). In this structure literature review, the search for contributions was conducted initially in the main academics search engines and later extended to generic search engines, in order to identify technical contributions of non-academic sources. In the search criteria were used several combinations of the keywords “enterprise architecture”, “value”, “benefit“, “driver”, “motivation”, “objective”, “goal”, “result” and “outcome”.

After analyzing all contributions identified in literature, it was established an initial list of 26 value drivers of Enterprise Architectures, each one characterized by a name and a short definition/ description in order to help study participants to better understand each value driver. In the name of each value driver, besides the identification of characteristic or action of the organization affected by enterprise architecture, it was also included the kind of impact suffered, whether it is an improvement, an increase, a reduction, etc. In table 1 are presented the 26 value drivers included in the predefined list of this study.

As mentioned, this research aimed not only on the identification of the Enterprise Architecture value drivers but also to establish a ranking according to their importance for organizations. In order to assess the level of importance assigned to each value driver by the experts, in the study's questionnaire was used the Q-Sort Method, a ranking technique that instead of assigning a rating to each individual item (e.g., using Likert scales) participants have to look at all items as a whole and separate them in several groups in a Q-Sort matrix, ranking from the less to the most important items. This procedure makes the respondents attribute different importance levels to each of the items, avoiding the concentration of responses in a given value in a Likert scale. The completion of the Q-Sort matrix by each expert generates an individual ranking of importance for the value drivers.

Table 1: Predefined List of Value Drivers

(Increased) Agility	(Improved) IT Delivery
(Improved) Alignment	(Improved) IT Integration
(Improved) Change Management	(Improved) Knowledge & Understanding
(Improved) Communication	(Increased) Management Satisfaction
(Reduced) Complexity	(Facilitated) Outsourcing
(Increased) Compliance	(Improved) Planning
(Reduced) Costs	(Improved) Portfolio Management
(Improved) Customer Orientation	(Increased) Process Improvement & Standard.
(Improved) Decision Making	(Improved) Quality
(Increased) Flexibility	(Increased) Reuse
(Improved) Governance	(Improved) Risk Management
(Fostered) Innovation	(Improved) Security Management
(Improved) Interoperability	(Improved) Time to Market

2.3 Stopping Criterion and Consensus Evaluation

Knowing when to stop the process is another important issue when implementing a Delphi study. If the process is finished too early (i.e., with a few rounds) the results may not be significant; and if the process has too many rounds the task may be too heavy to the participants (in terms of time and resources) and consequently contribute to withdrawals.

Ideally, a Delphi study should end when a consensus is reached and preferably validated by a set of statistical indicators to support the results obtained (Schmidt, 1997). The recommendation of the Delphi method is that at the end of each round the level of consensus should be evaluated and based on it make a decision: to proceed to a new iteration (round) if the level of consensus is not significant; or to end the study if the level is considered appropriate (Soares and Amaral, 2011). However, the desired level of consensus cannot always be achieved. A Delphi study may end when the researcher believes that sufficient information has been gathered or when a predefined maximum number of rounds is reached.

To evaluate the level of consensus it was decided to follow the criteria suggested by Soares and Amaral (Soares and Amaral, 2011) that include two components: (1) the level of agreement of the experts' opinion in the round which assesses the homogeneity or consistency of the opinion expressed by experts and (2) the level of stability of the global panel opinion between rounds

which assesses if the view expressed by the overall panel stabilizes over the rounds. To support this evaluation two statistical measures were selected: to evaluate the level of agreement of the experts' opinion in the round it was selected the Kendall's W coefficient in which a W>0.40 indicates an acceptable consensus between the responses in the round (Schmidt 1997); and to evaluate the level of stability of the global opinion between rounds was selected the Spearman's Rank correlation coefficient (Spearman's Rho) in which a value of Rho close to 1 represents a very satisfactory correlation between two ranks. Ideally, at the end of the study, a good level of consensus should be supported by satisfactory values in these two measures. Regarding the number of rounds, it was decided that in this study would be held three rounds at the most.

3. Survey Rounds

The Round 1 was initiated by sending an email to the 75 experts who had agreed to participate in the study. In this round, 57 experts completed the questionnaire (representing a response rate of 76%) providing a set of individual rankings that at the end of the round were compiled into a global panel rank of importance the round.

Besides the response to the questionnaire it was also requested to the experts the suggestion of new value drivers that in their view should be included in the study. In total, 31 suggestions for new value drivers were submitted by 17 experts, however after the analysis and selection based on a set of pre-established criteria only 3 new items were accepted. The criteria used to select the new value drivers were the following: (1) a new item should fit within the concept of value driver adopted in this study; (2) a new item should not be included in any existing items; (3) repeated or similar items should be grouped; and (4) a new item should be proposed by more than one expert. The selection results were reported to the 17 experts and only one expressed his disagreement. In Table 2 are presented the three new value drivers accepted and added in Round 2 of the Delphi study.

Table 2: New value drivers (after Round 1)

(Enhanced) Assurance
(Enhanced) Enterprise Integration & Consolidation
(Enhanced) Technological Evolvability

The Round 1 ended with the evaluation of the level of consensus achieved. Since it was the first round only one of the two evaluation criteria of the level of consensus was analyzed: the level of agreement of the experts' opinion, through the calculation of Kendall's W. The Kendall's W presented a value of only 0.217 ($p<0.001$) reflecting a weak level of agreement (not satisfactory) between the experts' individual ranks, however this value can be considered normal because it the first round of a Delphi study.

The Round 2 started once again with the sending of an email to participants, this time with the consolidated results from the previous round (the global panel rank of Round 1) and with the updated list of value drivers since 3 new ones were included. In this round only 73 experts were contacted (due to the withdrawal of two experts) of which 57 completed the questionnaire (representing a response rate of 78%). Although the experts had the opportunity to suggest new items, none did.

At the end of the available period to complete the questionnaire, once again was performed an analysis and consolidation of the individual rankings in the global panel rank and an evaluation of the level of consensus achieved in the round. For this evaluation, as mentioned above, two statistical measures were calculated: the Kendall's W (to assess the level of agreement of the experts' opinion in the round) and the Spearman's Rho (to assess the level of stability between Round1 and Round 2 ranks).

The value achieved in Kendall's coefficient of concordance (W=0.268, p<0.001) showed a slight improvement compared to previous round, but still reflected a weak level of agreement between the individual rankings and consequently a weak level of agreement of the experts' opinion. On the other hand, the value achieved by the Spearman's Rho correlation coefficient was very satisfactory (Rho=0.973, p <0.001), indicating a good correlation between the two global panel ranks and reflecting the absence of significant changes in the items positioning in the ranks. These contradictory results in the evaluation of the level of consensus led to the decision to initiate a third round in order to seek an improvement of the level of agreement among the experts.

Finally, in Round 3 the number of experts that completed the questionnaire was 52, representing a response rate of 71%. Regarding the evaluation of level of consensus achieved in this round, once again it was noticed an improvement in the level of agreement of the experts' opinion, however the value of Kendall's W (W=0.297; p<0.001) did not reach the desired value (W>=0.4). In the other hand, the level of stability measured by the Spearman's correlation coefficient remained very satisfactory (Rho=0.974; p<0.001), showing a high degree of stability in the global panel rank between rounds. One more time the results achieved in the two evaluation measures of consensus level were not entirely the desired results still, due to the fact that the maximum number of rounds established was reached and that some experts showed some fatigue in this round, it was decided to end the Delphi study and initiate the detailed analysis of the results.

4. Results and Discussion

This Delphi study, as mentioned above, aimed to identify the key value drivers of Enterprise Architectures and hierarchize them according to their importance for organizations. In Table 3 are presented the consolidated results of the Delphi study, including the positioning of each value driver in the global panel rank of importance in the study's three rounds and the average (of positioning in the individual ranks) and the standard deviation obtained by each value driver in Round 3.

4.1 Value Drivers Identification

This study identified 29 value drivers of Enterprise Architectures, 26 of which resulted from an extensive literature review and 3 proposed by the expert panel. The 26 value drivers obtained from literature review reflect the opinion expressed by several authors with respect to the goals, benefits and results of Enterprise Architecture that, in our view, are characteristics or actions (activities) of an organization that are affected by an Enterprise Architecture and influence the performance of the organization (and therefore creates value). Since the aim of the study was to identify the most important value drivers of Enterprise Architectures, the predefined list did not include all the value drivers found in literature, but the most referenced and those in which it was possible to provide a clear definition or description. The 3 value drivers proposed by the expert panel resulted from a process of analysis and selection of the 31 originally proposed items, in which it was intended to ensure that certain requirements were met. Of the 31 proposed items, 4 were rejected because in our opinion could not be considered value drivers, 15 were rejected because in our opinion fit in existing value drivers, 3 were rejected because they were only proposed by one expert (it was assumed that if it was important an item should be referred by several experts), and the remaining 9 resulted in the three accepted items.

During the study, to assess the possibility of eliminating any value driver were analysed several statistics such as the mean, standard deviation, minimum value, maximum value, the range, the interquartile range and eventual outliers. Given the results observed was not considered the elimination of any driver. Taking this into consideration, in our opinion, in this study was generated a comprehensive list of value drivers of Enterprise Architectures.

4.2 Importance of Value Drivers

Although one of the criteria used to evaluate the level of consensus in respect to the importance of value drivers, did not reach a satisfactory value, since the level of agreement of the experts' opinion measured by Kendall's W coefficient was in last round only of 0.293 (the minimum desired was 0.4), the analysis of the study results shows a strong consistency in global rankings, supported not only by the value achieved in the correlation coefficient used to measure the level of stability of opinion (Rho=0.974), but also by the realization that there are not big changes in overall positioning of the value drivers (13 of the 29 value drivers maintained in Round 3 the same position found on Round 2, most notably the 6 value drivers placed in the top six positions). It is important to note that the lack of agreement is a valid finding for a Delphi study (Skulmoski et al., 2007) and probably results from the heterogeneity of the expert panel.

Table 3: Delphi Study Results – *Value Drivers Ranking of Importance*

R1 Rank	R2 Rank	R3 Rank	Value Drivers	R3 AVG	R3 SD	Cluster a)
1	*1*	*1*	*(Improved) Alignment*	*5,10*	*5,78*	
3	*2*	*2*	*(Improved) Decision Making*	*6,94*	*6,38*	*1*
4	*3*	*3*	*(Improved) Governance*	*8,15*	*5,44*	
2	*4*	*4*	*(Increased) Agility*	*9,60*	*7,03*	
6	*5*	*5*	*(Improved) Change Management*	*10,60*	*7,61*	
8	*6*	*6*	*(Improved) Planning*	*11,27*	*8,01*	*2*
12	*9*	*7*	*(Improved) Knowledge & Understanding*	*11,37*	*6,72*	
*	*8*	*8*	*(Enhanced) Enterprise Integration & Consolidation*	*11,69*	*6,63*	
7	*10*	*9*	*(Reduced) Complexity*	*12,83*	*7,95*	
10	*15*	*10*	*(Increased) Flexibility*	*12,85*	*6,34*	
5	*7*	*11*	*(Improved) Communication*	*13,13*	*7,90*	
14	*12*	*12*	*(Improved) Interoperability*	*13,83*	*7,00*	*3*
11	*13*	*13*	*(Increased) Process Improvement & Standardization*	*14,10*	*7,37*	
17	*16*	*14*	*(Increased) Reuse*	*14,23*	*7,10*	
9	*11*	*15*	*(Improved) Portfolio Management*	*14,23*	*7,14*	
13	*14*	*16*	*(Reduced) Costs*	*15,56*	*7,38*	
18	*17*	*17*	*(Improved) Risk Management*	*16,00*	*6,41*	
15	*18*	*18*	*(Improved) IT Integration*	*17,19*	*7,31*	
19	*20*	*19*	*(Improved) Quality*	*17,50*	*6,46*	
20	*21*	*20*	*(Fostered) Innovation*	*17,60*	*8,40*	*4*
16	*19*	*21*	*(Improved) Customer Orientation*	*17,98*	*8,06*	
22	*24*	*22*	*(Improved) IT Delivery*	*18,23*	*8,14*	
23	*23*	*23*	*(Improved) Time to Market*	*18,48*	*8,22*	
21	*22*	*24*	*(Increased) Compliance*	*18,60*	*6,17*	
25	*28*	*25*	*(Increased) Management Satisfaction*	*20,13*	*7,79*	
*	*27*	*26*	*(Enhanced) Assurance*	*20,23*	*7,24*	
24	*26*	*27*	*(Improved) Security Management*	*21,79*	*5,84*	*5*
*	*25*	*28*	*(Enhanced) Technological Evolvability*	*21,81*	*5,85*	
26	*29*	*29*	*(Facilitated) Outsourcing*	*24,00*	*6,31*	

** These items were only introduced in Round 2.*
AVG – Average; SD - Standard Deviation
a) Cluster Analysis Results (see Appendix A)

An important finding in the study results is the fact that the value driver related with the alignment in organizations is considered in all rounds the most important value driver of Enterprise Architectures. This fact demonstrates the role and the importance of Enterprise Architectures not only for the strategic adjustment between business strategies and infrastructure and processes, but mostly, as reported by several authors, for the alignment between business and IT domains (e.g. (Op't Land et al., 2009, Zachman, 2001)).

Regarding the consistency in the positioning of value drivers in the ranks, the results show that the value drivers placed on the TOP10 are almost always the same (with few exceptions), and the same applies to the value drivers positioned below position 22th. This evidence opens the possibility, among the 29 value drivers identified in this study, to form several groups of value drivers according to their level of importance. More than just place a value driver in a specific position of the global panel rank, it is considered important to see which ones are closest in terms of importance and identify some groups with the most important.

In order to identify these groups it was decided to adopt the Cluster Analysis, which is an exploratory data analysis tool for organizing observed data (e.g. people, things, events) into meaningful taxonomies, groups, or clusters, based on combinations of ranges, and maximizing the similarity of items within each cluster, while maximizes the dissimilarity between groups initially unknown (Burns and Burns, 2008). The method of clusters used was the "Ward's Method" with the similarity measure "Square Euclidean distance" because it is a method used in studies of a similar nature with results satisfactory (e.g., (Santos, 2004)).

Using as reference the average values of the final rank (Round 3 global panel rank) was generated in the SPSS a Dendrogram (Appendix A), in which are identified five groups. The first cluster/group identified in Cluster Analysis is formed by the first three value drivers of the final rank, which includes the value drivers related with the Alignment, Decision Making and Governance. The composition of this cluster, with the three most important value drivers, highlights the role that Enterprise Architectures may have in helping organizations to improve the organizational alignment in which assumes particular relevance the alignment between business and IT; and to improve two important management activities, namely the decision making activities and the corporate governance activities which includes IT governance.

In a second cluster, the Cluster Analysis considers the value drivers between positions 4 and 8 in the final rank, which includes the value drivers related with Agility, Change Management, Planning, Knowledge & Understanding and Enterprise Integration & Consolidation. In this cluster it is important to make reference to the value driver related with the Enterprise Integration & Consolidation which is the only value driver suggested by experts that obtained a relevant position in the global panel rank of importance. The third cluster includes the value drivers positioned between the 9th and 15th positions of the final rank, i.e., the value drivers related with Complexity, Flexibility, Communication, Interoperability, Process Improvement & Standardization, Reuse and Portfolio Management. In the fourth cluster, the Cluster Analysis includes the value drivers positioned between the 16th and 22th of the final rank. Finally, in the last cluster are included the last five value drivers of the final rank, which are considered by the expert panel as the less important value drivers of the 29. In this last cluster, are included two of the three value drivers proposed by the experts (Assurance and Technological Evolvability) and the value drivers related with the Management Satisfaction, Security Management and Outsourcing.

Besides having allowed the identification of five clusters, the Dendrogram also showed that statistically there is a greater proximity between the first three clusters (with value drivers positioned between 1st and 15th position), which in turn are distanced from the other two clusters (with items between the 16th and 29th position). Based in this statistical analysis and in the

analysis of the evolution of global rankings, in our opinion, the first three clusters with the top 15 value drivers of the final rank can be classified as the most important, as the key value drivers of the Enterprise Architectures. In Figure 1 are represented the three main clusters and its key value drivers.

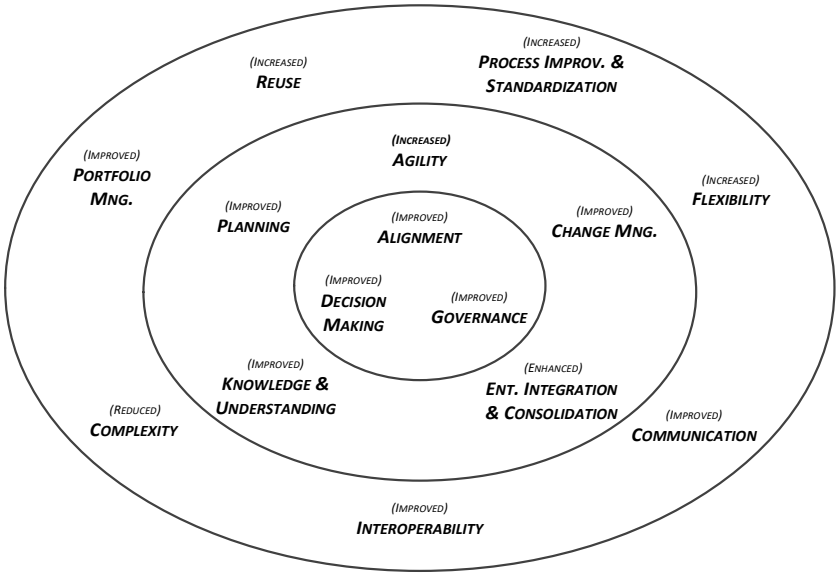

Fig 1. Key Enterprise Architecture Value Drivers

5. Future Work and Conclusions

This work constitutes the basis of a more comprehensive research project that aims to identify the key value drivers of Enterprise Architectures and determine how these value drivers have an impact on organizations. As a continuation of this work we are currently studying how each value driver can be characterized, how they have an impact and create value on organizations, and what are the interdependencies between the key value drivers.

In this paper we presented the results of a Delphi study in which the main objective was to identify, systemize and prioritize the key value drivers of Enterprise Architectures for organizations. Given the fact that this study focuses on an area of interest that has not been extensively explored, we believe to have generated a comprehensive list of 29 value drivers of Enterprise Architectures that can be considered as a valid contribution to identify what is important in the Enterprise Architectures value assessment and at the same time it provides a solid basis for the future development of a value measuring system for Enterprise Architectures.

Despite one of the two criteria established for evaluating the level of consensus on the value drivers importance (the level of agreement of experts' opinion) did not achieved a satisfactory value as intended, the analysis of the study results showed a strong consistency in the global panel rank that, complemented with the Cluster Analysis, allowed to identify an interesting set of clusters that provide a clear and comprehensive overview of the most important value drivers of Enterprise Architectures.

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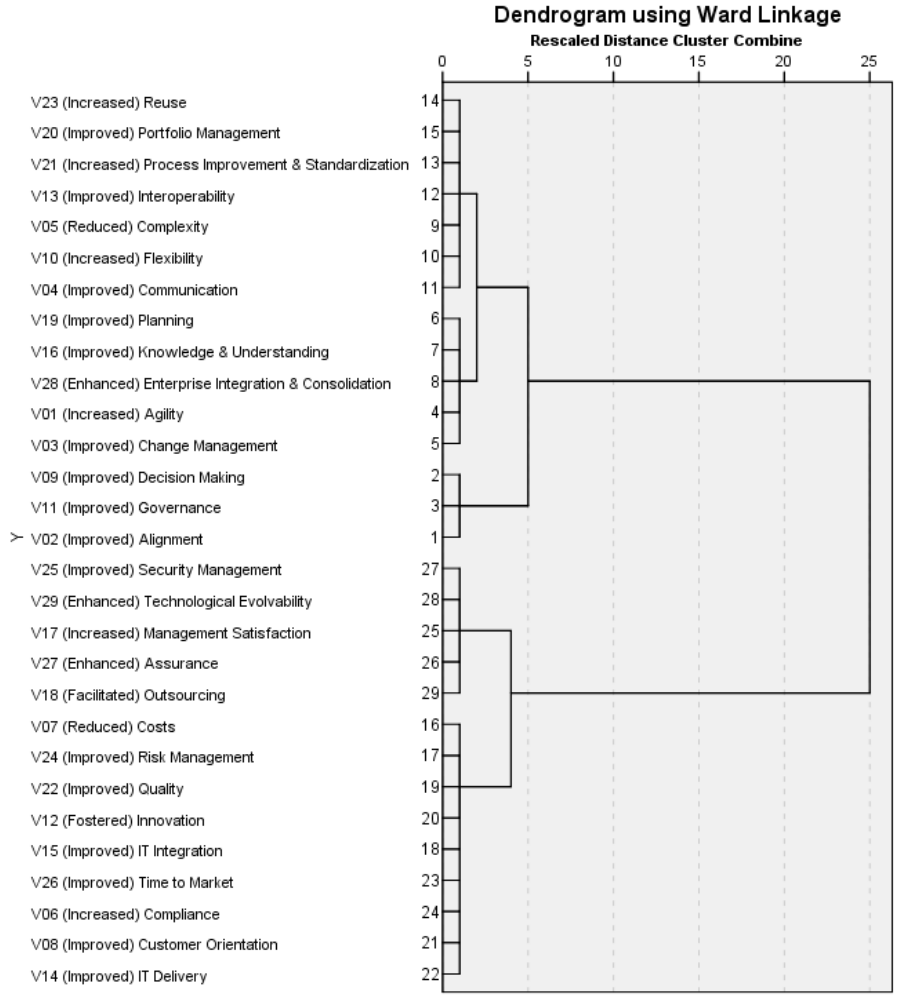
Appendix A


Dendrogram using Ward Linkage
Rescaled Distance Cluster Combine
0
5
10
15
20
25
V23 (Increased) Reuse 14
V20 (Improved) Portfolio Management 15
V21 (Increased) Process Improvement & Standardization 13
V13 (Improved) Interoperability 12
V05 (Reduced) Complexity 9
V10 (Increased) Flexibility 10
V04 (Improved) Communication 11
V19 (Improved) Planning 6
V16 (Improved) Knowledge & Understanding 7
V28 (Enhanced) Enterprise Integration & Consolidation 8
V01 (Increased) Agility 4
V03 (Improved) Change Management 5
V09 (Improved) Decision Making 2
V11 (Improved) Governance 3
V02 (Improved) Alignment 1
V25 (Improved) Security Management 27
V29 (Enhanced) Technological Evolvability 28
V17 (Increased) Management Satisfaction 25
V27 (Enhanced) Assurance 26
V18 (Facilitated) Outsourcing 29
V07 (Reduced) Costs 16
V24 (Improved) Risk Management 17
V22 (Improved) Quality 19
V12 (Fostered) Innovation 20
V15 (Improved) IT Integration 18
V26 (Improved) Time to Market 23
V06 (Increased) Compliance 24
V08 (Improved) Customer Orientation 21
V14 (Improved) IT Delivery 22